

Study on the Bradybaenid Landsnails in NW Sichuan (Gastropoda: Pulmonata: Stylommatophora)

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Abstract: A new species *Pseudiberus* (*Pseudiberus*) *maoensis* sp. nov. was proposed, and the first dissection study was carried out upon *Bradybaena* (*Bradybaena*) *pseudocampylaea* (Moellendorff), *Bradybaena* (*Bradybaena*) *sueshanensis* Pilsbry, and *Bradybaena* (*Bradybaena*) *controversa monotaeniata* Pilsbry. All examined specimens as well as types are housed in the Institute of Zoology, the Chinese Academy of Sciences, Beijing.

Key words: Helicoidea; Bradybaenidae; NW Sichuan; Malacofauna; New species

四川西北部巴蜗牛类研究兼一新种描述 (腹足纲: 肺螺亚纲: 柄眼目)

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摘要: 对川西北陆生贝类巴蜗牛科进行了系统整理。其中对假弯巴蜗牛 [*Bradybaena* (*Bradybaena*) *pseudocampylaea* (Moellendorff)]、松山巴蜗牛 [*Bradybaena* (*Bradybaena*) *sueshanensis* Pilsbry]、单带反向巴蜗牛 [*Bradybaena* (*Bradybaena*) *controversa monotaeniata* Pilsbry] 进行了解剖。描述了新种茂县蛇蜗牛 *Pseudiberus* (*Pseudiberus*) *maoensis* sp. nov., 其模式标本及其他研究标本均保存于中国科学院动物研究所。

关键词: 蜗牛总科; 巴蜗牛科; 川西北; 贝类区系; 新种

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The study on the helicoid snails (Bradybaenidae: Bradybaeninae) in northwest Sichuan has been spanning for more than one hundred and thirty years. The material from most areas of NW Sichuan, covering thirty counties and branches of Daduhe River, has been collected for study. There are a few notable works pertaining to this important animal group of the area. The first known collection was made by Abbé Armand David in Baoxing County which was also called Muping/Moupin previously. The precise collection time is unknown but could be deduced to be not later than 1870, because this lot of material was identified

by M. Deshayes from 1870 to 1874. Between 1883 and 1884 Vincenz Hilber examined the specimens collected by geologist Ludwig von Lóczy from 1877 to 1880 in N Sichuan. The type materials were then preserved in the National Museum at Budapest before they had been destroyed during the second World War (Andrzej Wiktor, personal communication). From 1882 to 1890, Père Heude studied the material from Sichuan Province, including very few specimens collected by Dolan from W Sichuan. The important follow-up was the collection made by Russian Grigori Nikolajewitsch Potanin and Michail Michailowitsch Beresowski dur-

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ing the period of 1881 – 1886. The shells as well as a few specimens provided by Grum-Grshimailo brothers, Colonel Putiata, Piassetzki and Grombtschewski were examined by O.von Moellendorff in 1899; and the anatomy study with the same material was presented by Fritz Wiegmann from 1899 to 1902. The work of both Moellendorff and Wiegmann made up a most important classical part of the study on Chinese malacofauna (Moellendorff, 1899; Wiegmann, 1900). Most of the specimens examined by them have been housed in the Zoology Museum of St.Petersburg today. From 1913 to 1915, with the excitement of observing a totally different malacofauna, Dolan, a member of Walter Stötzner Expedition made a collection in the same area and he passed the land snails on to Herr W. Blume via a chemist J.Schedel. For unknown reasons, only partial specimens were examined by Blume, whose work received the help from Wagner and Fritz Haas (Blume, 1925; Pilsbry, 1934). In 1933, Henry A. Pilsbry studied the land mollusk specimens collected from the Dolan West China expedition carried out in 1931 and covering the NW Sichuan (in Pilsbry 1934, Fig.1, two place names “Rumichangu” and “Sinkaitze” should indicate “Danba/Tanpa” and “Xiaojin/Siaokin” respectively according to the map). The materail used by Pilsbry is preserved now in the Academy of Natural Science of Philadelphia (ANSP).

Up to now, a total of 75 bradybaenid species belonging under nine genera have been reported from NW Sichuan (Wu, unpublished data). It reveals that this area is abundant in helicoid snails. Because above malaco-collections were passingly made as parentheses of the surveys on the mammals and birds in W China, and when collecting mollusks in median to tiny size, more than 50% species of the total local malacofauna, were usually ignored (Pilsbry, 1934). However, it's rather insufficient for the investigation upon this area since that mountainous landscape constructs a good diversity of habitat, according to many previous and recent researchers.

Although not covered in recent work, it is notable that *Euhadra* species were reported from different localities in China according to the shell features

(Blume, 1925; Crosse, 1864; Gude, 1902; Heude, 1885, 1889; Moellendorff, 1899; Wiegmann, 1900; Yen, 1939). According to the recent study of bradybaenids in China, none of the snails anatomically known has “flagellum + mucous glands with numerous ducts” — the associated characters which essentially delimitate *Euhadra* in view of genital structure. All species classified with *Euhadra* by the classical authors are banded and coloured *Bradybaena* or *Fruticicola* species (see Wiegmann, 1900), and those of Yen are *Nesiohelix* species (see Yen, 1939) (Hartmut Nordsieck, personal communication). So it might indicate that in China, there is not real *Euhadra* snail.

The abbreviations and their corresponding meanings used in the illustrations and the context are as follows: AG—albumen gland; Ah—aperture height; AS—accessory sac; At—atrium; Aw—aperture width; DS—dart sac; Ewh—embryonic whorl/embryonic whorl number; MG—mucous glands; P—penis; PR—penial retractor muscle; PS—penial sheath; S—spermatheca; SD—spermathecal duct; Umb—umbilicus; Va—vagina; VD—vas deferens; ZMIZ—Zoology Museum of Institute of Zoology, the Chinese Academy of Sciences, Beijing. In the context the measurement unit for length was mm. All the length measurements are taken with 0.01 mm accuracy, and whorl numbers are counted as described by Kerney & Cameron (1979), with accuracy to 1/8 whorl.

1 Systematic Accounts

1.1 *Aegista* (*Aegista*) *permellita* (Heude, 1886) (Fig.1A, Table 1)

Material examined: ZMIZ01033, four mature empty shells and nine young shells. Sichuan, Dujiangyan, Puyangzheng, Huaxicun Bannuosi, 24 – IX – 2001, 579 meters a.s.l. (31°03'50.8"N, 103°43'0.8"E), leg. WU Min & XIAO Zhi-shu.

1.2 *Aegista* (*Plectotropis*) *submissa* Deshayes 1873 (Fig.1B, Table 1)

Material examined: ZMIZ01012, 41 mature snails and 19 young shells. Sichuan, Dujiangyan, 24 – IX – 2001, 551 meters a.s.l. (31°00'11.7"N, 103°

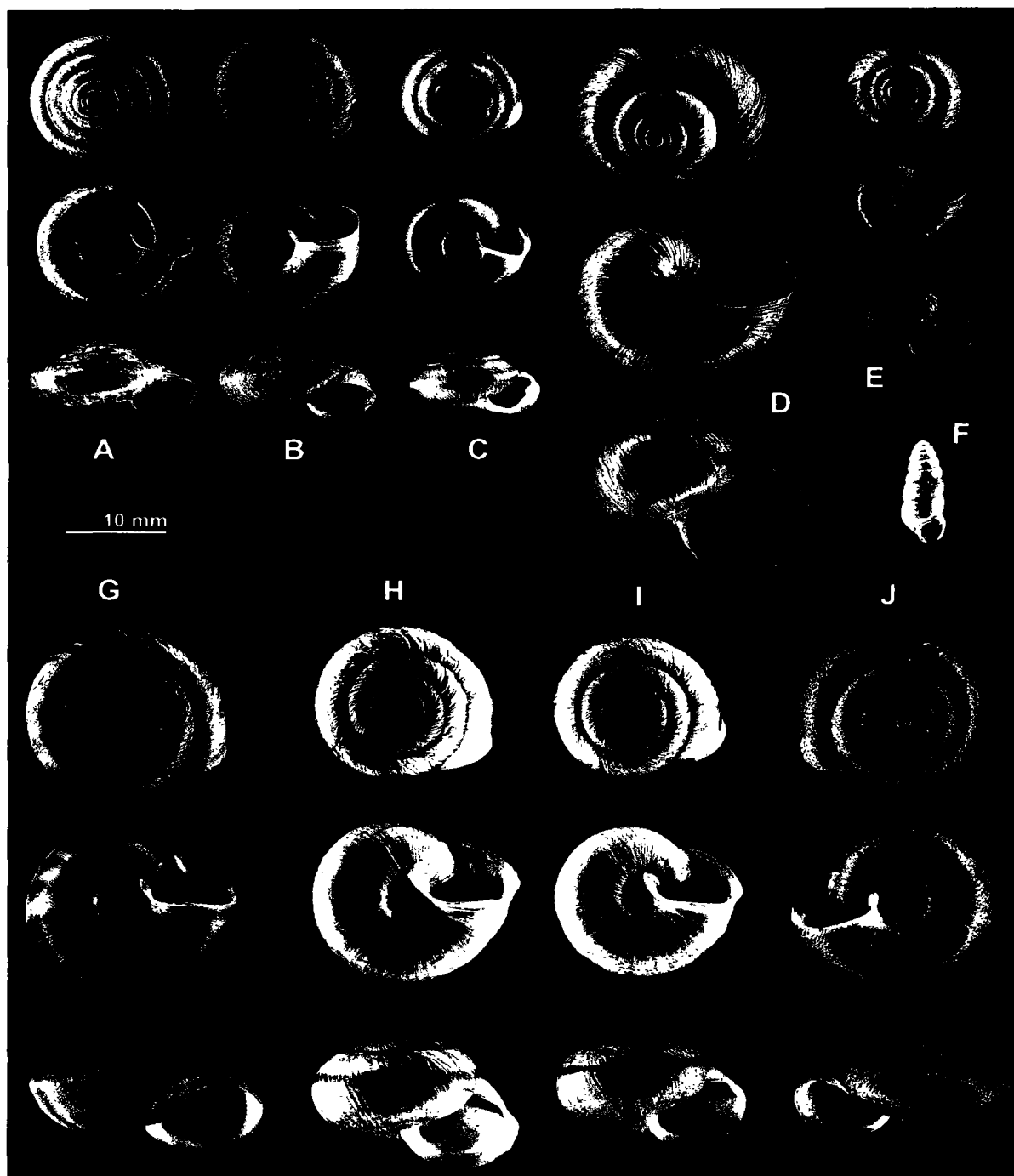


Fig. 1 Shells of ten helicoid snails from NW Sichuan

A: *Aegista (Aegista) permellita* (Heude, 1886), ZMIZ01033 - sp4; B: *Aegista (Plectotropis) submissa* Deshayes 1873, ZMIZ01012 - sp6; C: *Plectotropis* sp., ZMIZ01044 - sp1; D: *Acusta ravid*a (Benson, 1842), ZMIZ01025 - sp1; E: *Acusta ravid*a (Benson, 1842), ZMIZ01041 - sp1; F: *Pseudobuliminus (Bulimindius)* sp., ZMIZ01024 - sp1; G: *Bradybaena (Bradybaena) pseudocampylaea* (Moellendorff, 1899), ZMIZ01030 - sp1; H: *Bradybaena (Bradybaena) sueshanensis* Pilsbry 1934, ZMIZ01020 - sp1; I: *Bradybaena (Bradybaena) sueshanensis* Pilsbry 1934, ZMIZ01048 - sp1; J: *Laeocathaica (Trichocathaica) rugosobasis* (Pilsbry, 1934), ZMIZ01027 - sp4. Bar equals 10 mm.

Table 1 Descriptive statistics of the shells of known species in Bradybaenid landsnails from NW Sichuan

Species	No. of samples	Mean \pm SD Range						
		Ewh	Whorl	Height	Width	Aw	Ah	Umb
<i>Aegista</i> (A.) <i>permellita</i>	4	1.594 \pm 0.120 1.500 - 1.750	5.906 \pm 0.277 5.625 - 6.250	7.70 \pm 0.37 7.48 - 8.25	13.62 \pm 0.46 12.97 - 13.97	5.12 \pm 0.09 5.06 - 5.25	5.80 \pm 0.22 5.55 - 6.06	3.86 \pm 0.34 3.50 - 4.26
<i>A.</i> (<i>Plectotropis</i>) <i>submissa</i>	20	1.531 \pm 0.055 1.500 - 1.625	4.650 \pm 0.193 4.375 - 5.125	6.17 \pm 0.64 5.34 - 7.99	11.02 \pm 0.95 9.79 - 13.01	4.35 \pm 0.55 3.55 - 5.43	5.03 \pm 0.44 4.24 - 5.94	2.54 \pm 0.25 2.15 - 3.11
<i>A.</i> (<i>P.</i>) sp.	7	1.500 \pm 0.125 1.250 - 1.625	5.125 \pm 0.204 4.875 - 5.500	6.78 \pm 0.25 6.56 - 7.19	11.36 \pm 0.66 10.49 - 12.37	4.63 \pm 0.29 4.19 - 4.94	5.00 \pm 0.27 4.78 - 5.38	2.68 \pm 0.24 2.36 - 2.95
<i>Acusta ravida</i> (ZMIZ01025)	3	1.333 \pm 0.072 1.250 - 1.375	4.750 \pm 0.000 4.750 - 4.750	14.07 \pm 0.07 13.99 - 14.12	16.66 \pm 0.59 16.05 - 17.23	9.74 \pm 0.49 9.30 - 10.26	10.15 \pm 0.36 9.91 - 10.56	-
<i>A. ravida</i> (ZMIZ01041)	2	1.438 \pm 0.088 1.375 - 1.500	4.438 \pm 0.088 4.375 - 4.500	8.89 \pm 0.57 8.49 - 9.29	10.51 \pm 0.64 10.06 - 10.96	5.54 \pm 0.04 5.51 - 5.56	6.41 \pm 0.07 6.36 - 6.46	-
<i>Bradybaena</i> (<i>B.</i>) <i>pseudocampylaea</i>	22	1.466 \pm 0.0691 1.250 - 1.500	5.540 \pm 0.220 5.125 - 6.250	9.32 \pm 1.17 7.52 - 13.35	18.24 \pm 1.73 16.06 - 24.38	7.97 \pm 0.98 6.92 - 11.58	8.45 \pm 0.96 7.40 - 11.75	3.37 \pm 0.29 2.91 - 3.97
<i>B.</i> (<i>B.</i>) <i>sueshanensis</i> (ZMIZ01041)	2	1.625 \pm 0.177 1.500 - 1.750	5.125 \pm 0.177 5.000 - 5.250	10.84 \pm 0.09 10.78 - 10.90	15.10 \pm 0.10 15.03 - 15.17	6.72 \pm 0.33 6.49 - 6.96	8.01 \pm 0.49 7.66 - 8.35	1.96 \pm 0.16 1.85 - 2.07
<i>B.</i> (<i>B.</i>) <i>controversa</i> <i>monotaeniata</i>	21	1.560 \pm 0.116 1.250 - 1.750	5.434 \pm 0.151 5.250 - 5.625	10.94 \pm 0.80 9.86 - 12.48	18.82 \pm 1.35 16.29 - 21.22	8.15 \pm 0.75 7.17 - 9.93	9.09 \pm 0.63 7.91 - 10.41	2.34 \pm 0.31 1.85 - 2.97
<i>Laeocathaica</i> (<i>Trichocathaica</i>) <i>rugosobasis</i>	12	1.531 \pm 0.057 1.500 - 1.625	5.594 \pm 0.142 5.375 - 5.750	7.48 \pm 0.62 6.49 - 8.46	15.17 \pm 0.97 14.07 - 17.09	5.39 \pm 0.53 4.30 - 5.98	6.56 \pm 0.53 5.75 - 7.62	3.46 \pm 0.28 3.08 - 3.84

37°03.8"E), leg. WU Min.

Remarks: Although its genitalia is not illustrated here, the work on its genital system shows it is a total different group which can be distinguished from normal *Aegista* species by the lack of a epiphallic flagellum (Wu, unpublished data). Here the position of the species is temporary and the discussion on this group, with its close species included, has been reviewed for publication elsewhere.

1.3 *Plectotropis* sp. (Fig. 1C, Table 1)

Material examined: ZMIZ01044, seven empty mature shells and six young shells. Sichuan, Songpan County, Chuanzhusi, Shilipu, 27 to 28 - IX - 2001, 2 860 meters a.s.l. (32°41'27.0"N, 103°36'33.4"E), leg. WU Min.

Remarks: This species doesn't belong to *Bradybaena* nor *Cathaica* conchologically. It is quite similar to *Plectotropis icela* Pilsbry 1934 in the form of aperture, although in *icela* the periphery distinctly bears a projective keel. However, it's generic position will not be determined until the information of its genitalia is known.

1.4 *Acusta ravida* (Benson, 1842) (Fig. 1: D & E, Table 1)

Material examined: ZMIZ01025, three empty mature and eight young shells. Sichuan, Mao County, 5 km south to the town of Mao County, 11 - X -

2001, 1 574 meters a.s.l. (31°39'35.4"N, 103°48'48.7"E), leg. WU Min; ZMIZ01041, two mature and one young empty shells, Dujiangyan, 24 - IX - 2001, 551 meters a.s.l. (31°00'11.7"N, 103°37'03.8"E), leg. WU Min.

Remarks: The species titled *Acusta ravida* (including its subspecies) comprises a group of ovate snails with similar shape and of a variety of sizes. Different local populations, show stably differentiated terminal genitalia both in male and in female part, which would bear a series of important diagnostic characters. This question will be resolved elsewhere. Geographically, this area is situated at the most western region of occupancy range for *Acusta*.

1.5 *Bradybaena* (*Bradybaena*) *pseudocampylaea* (Moellendorff, 1899) (Fig. 1G, Fig. 2: A - D, Table 1)

Soft part (Fig. 2: A - D): Body anteriorly in blackish leaden, posteriorly in light brown, sole laterally with two leaden longitudinal zones. Mantle creamy with very few dark spots at the front part. Jaw with five ribs dentating the margin. Atrium slightly protruding and short. Penial sheath present. Penis ca. two times longer than dart sac, thin but swollen unilaterally near epiphallus. Retractor thin and short. Dart sac closely associated with the vagina. Dart sac large. Amatorial dart ca. 4 mm, slightly curved; section with two

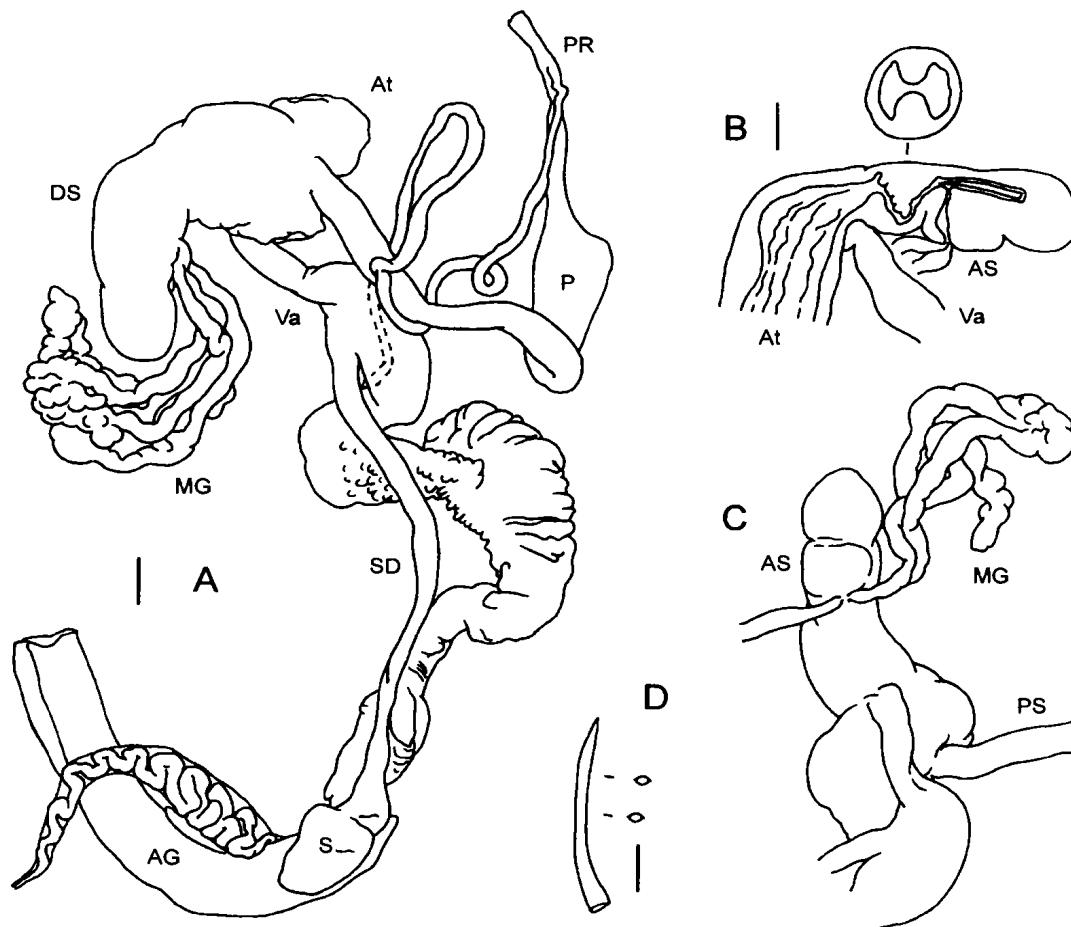


Fig.2 Genital dissection of *Bradybaena* (*Bradybaena*) *pseudocampylaea* (Moellendorff, 1899), ZMIZ01030 - sp1

A: General view of genitalia; B: Sagittal view of dart apparatus; C: Bottom view of dart apparatus; D: Amatorial dart with cross-sections. Bars equal 1 mm.

sharp edges. Accessory sac distinct and empty. Mucous glands two, as long as dart sac, stalk distinct. Lobules complicated and simply branched. Spermatheca oval. Duct of spermatheca long.

Material examined: ZMIZ01030, ninety mature and 32 young snails, all specimens with soft parts, Mao County (5 km south to the town of Mao County), Sichuan, 11 - X - 2001, 1 574 meters a.s.l. ($31^{\circ}39'35.4''\text{N}$, $103^{\circ}48'48.7''\text{E}$), leg. WU Min.

Remarks: This species seems to obviously belong to the group of *Aegista* (*Plectotropis*) *submissa*, which should be separated from the typical *Aegista*/*Plectotropis* due to the absence of the epiphallid flagellum.

1.6 *Bradybaena* (*Bradybaena*) *sueshanensis* Pilsbry, 1934 (Fig.1: H & I, Fig.3: A - B,

Table 1)

Material examined: ZMIZ01020, one mature shell with soft part. Sichuan, Songpan County, Chuanzhusi, Hongjun Monument, 2001 - IX - 29, 2 900 - 3 000 meters a.s.l. ($32^{\circ}41'27.0''\text{N}$, $103^{\circ}36'33.4''\text{E}$), leg. WU Min, measurement of ZMIZ01020 - sp1: Ewh 1.250, Whorl 5.000, Height 12.81, Width 16.67, Aw 8.17, Ah 8.85, Umb 1.98; ZIMIZ01048: Two mature shells. Chuanzhusi, Shilipuxiang, Songpan County, Sichuan, 27 - IX - 2001 to 28, 2 860 meters a.s.l. ($32^{\circ}41'27.0''\text{N}$, $103^{\circ}36'33.4''\text{E}$), leg. WU Min.

Soft part (Fig.3: A - B): Mantal anteriorly with numerous sparsely distributed brown spots, posteriorly more darkened. Atrium short. Penial sheath present.

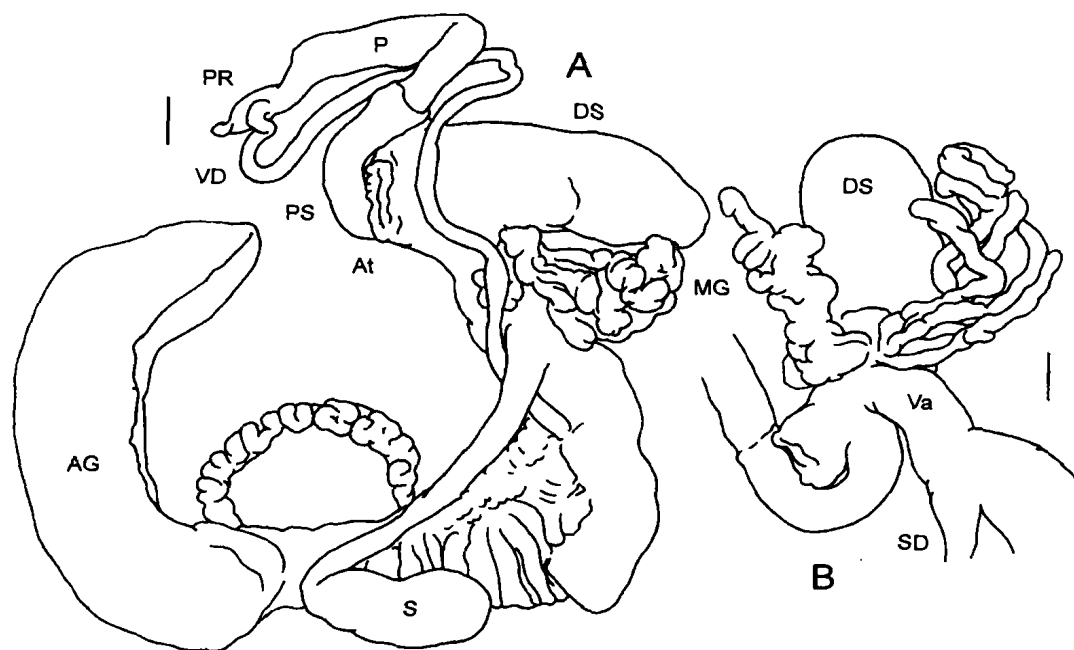


Fig.3 Genital dissection of *Bradybaena* (*Bradybaena*) *sueshanensis* Pilsbry 1934, ZMIZ01020 - sp1
A: General view of genitalia; B: Bottom view of dart apparatus. Bars equal 1 mm.

Penis short and swollen. Retractor thick and short. Dart sac closely associated with the vagina. Dart sac large. Accessory sac empty, indistinct. Mucous glands in two groups, as long as dart sac, stalk distinct. Lobules complicated and irregularly arborescent. Spermatheca somewhat elongatedly oval. Duct of spermatheca short.

Remarks: This species is very infrequently seen and shows a very low population density, inhabiting humid litter layer under good vegetation condition. It is noticed that it is completely absent in the loess area nearby stone hills.

1.7 *Bradybaena* (*Bradybaena*) *controversa monotaeniata* Pilsbry, 1934 (Fig.4: A - D, Table 1)

Material examined: ZMIZ01031, 113 mature shells and 99 young shells, all with soft parts. Mao County (5 km south to the town of Mao County), Sichuan, 11 - X - 2001, 1 574 meters a.s.l. (31° 39'35.4"N, 103°48'48.7"E), leg. WU Min.

Soft part: (Fig.4: A - D): Mantle with a middle longitudinal brown band. Jaw with four to five ribs dentating the margin. Atrium short. Penial sheath

present. Penis swollen, penial pilasters simple but with two thickened ones near epiphallus. Retractor thick and short. Dart sac small, with a neck part. Amatorial dart about 2 mm long, with rounded section. Accessory sac large but simple within. Mucous glands 4, longer than dart sac, inserting into end of accessory sack. Lobules complicated and irregularly arborescent. Spermatheca oval. Duct of spermatheca long.

Ecological remarks: *B. (B.) controversa monotaeniata* was only found at a dry sandy hillside of ca. 60 meters high, with poor vegetation. Beyond the hill is the dry valley. They are in a terribly high density, usually more than 50 individuals per square meter, congregated with many *B. (B.) pseudocampylaea* and comparatively very few individuals of *Pseudiberus* (*Pseudiberus*) *maoensis* sp.nov. For this species, although not directly observed, odorous plants are guessed to be in its dietary range because they tended to congregate on the stems and twigs of bunge prickly ash as well as an unknown compositae weed.

1.8 *Pseudobuliminus* (*Bulimindius*) sp. (Fig. 1F)

Material examined: ZMIZ01024, one mature empty

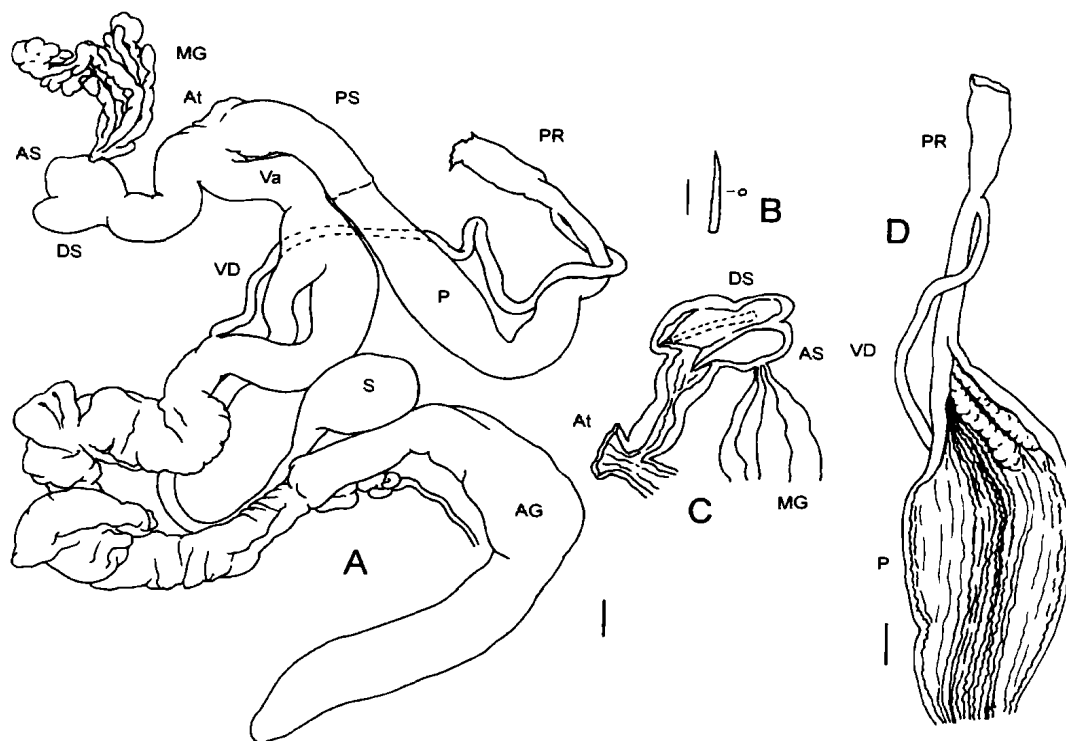


Fig.4 Genital dissection of *Bradybaena* (*Bradybaena*) *controversa monotaeniata* Pilsbry 1934, ZMIZ01031

A: General view of genitalia, ZMIZ01031 – sp1; B: Amatorial dart and cross-section, ZMIZ01031 – sp3; C: Sagittal view of dart apparatus, ZMIZ01031 – sp2; D: Exposed penis, ZMIZ01031 – sp1. Bars equal 1 mm.

shell. Mao County (5 km south to the town of Mao County), Sichuan, 11 – X – 2001, 1 574 meters a.s.l. (31°39'35.4"N, 103°48'48.7"E), leg. WU Min.

Ewh 1.375, Whorl 8.125, Height 10.14, Width 4.23, Aw 2.70, Ah 3.01.

Remarks: This species, like a fairly shortened *Pseudobuliminus* (*Bulimindius*) *hirsutus* Moellendorff, 1899. Because only one empty shell was collected, although it is surely a full mature specimen, the snail is still listed here as an undetermined species.

1.9 *Laeocathaica* (*Trichocathaica*) *rugosobasis* (Pilsbry, 1934) (Fig.1J, Table 1)

Material examined: ZMIZ01027, twelve mature shells and ten young shells. Mao County (5 km south to the town of Mao County), Sichuan, 11 – X – 2001, 1 574 meters a.s.l. (31°39'35.4"N, 103°48'48.7"E), leg. WU Min.

2 New Taxon

2.1 *Pseudiberus* (*Pseudiberus*) *maoensis* sp.nov. (Fig.5, Table 2)

Types: Holotype, ZMIZ01032 – sp1, a mature empty shell; paratypes, ZMIZ01032 – sp2 – 36, 26 mature empty shells and nine young shells including two snails collected when alive. Type locality: Mao County (5 km south to the town of Mao County), Sichuan, 11 – X – 2001, 1 574 meters a.s.l. (31°39'35.4"N, 103°48'48.7"E), leg. WU Min.

Diagnosis: Shell extremely depressed. Body whorl peripherily carinated. Lip basally expanded. Aperture continuous. Growth lines disorderedly arranged.

Shell (Fig.5A – B): Height 6.09 – 7.96 (mean 7.15) mm; diameter (maj.) 16.00 – 19.17 (mean 17.79) mm; ratio of height to diameter 0.34 – 0.45 (mean 0.40). Shell dextral; thick and solid. Shell apex distinct. Shell with 5.125 – 5.750 (mean 5.417)

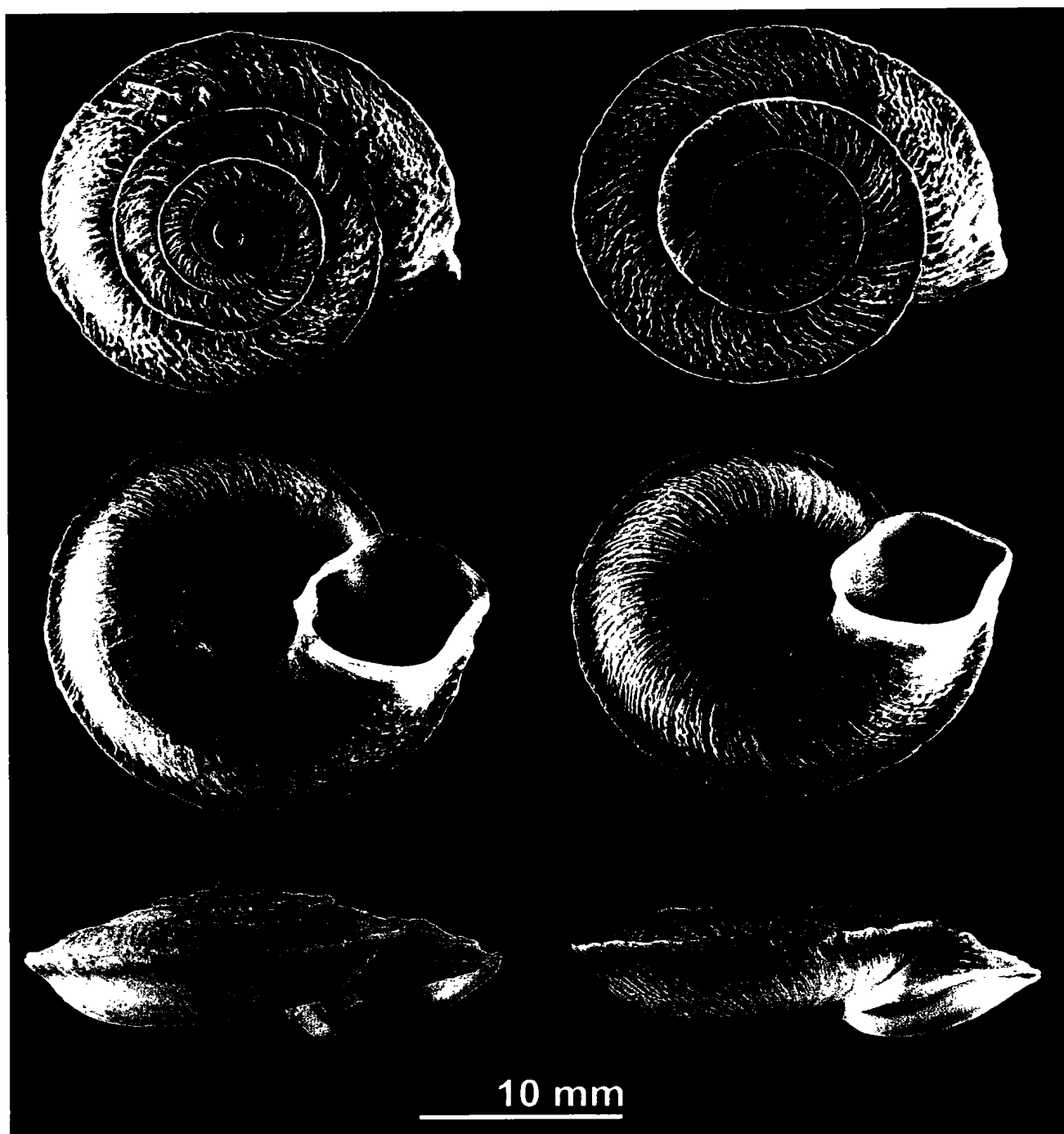


Fig.5 Shells of *Pseudiberus* (*Pseudiberus*) *maoensis* sp.nov., ZMIZ01032
Left: Holotype, ZMIZ01032 - sp1; right: Paratype, ZMIZ01032 - sp4. Bar equals 10 mm.

Table 2 Descriptive statistics for *Pseudiberus* (*Pseudiberus*) *maoensis* sp. nov., ZMIZ01032, based upon holotype and 20 randomly chosen full-grown paratypes

	Holotype	Mean \pm SD	Minimum	Maximum
Ewh	1.625	1.528 \pm 0.080	1.375	1.750
Whorl	5.625	5.417 \pm 0.166	5.125	5.750
Height	7.56	7.15 \pm 0.52	6.09	7.96
Width	17.70	17.79 \pm 0.65	16.00	19.07
Aw	6.50	6.23 \pm 0.28	5.71	6.81
Ah	7.56	7.65 \pm 0.53	6.67	8.71
Umb	3.92	3.98 \pm 0.37	3.13	4.61

whorls; embryonic with 1.375 – 1.750 (mean 1.528) whorls; whorls seldom convex. Suture not markedly impressed. Umbilicus rather broad, 3.13 – 4.61 (mean 3.98); ratio of umbilicus diameter to shell diameter 0.18 – 0.26 (mean 0.22). Columella slightly arched to oblique, columellar lip neither dilated nor covering umbilicus. Spiral furrows absent. Embryonic shell finely granulose. Immature shells also sharply angulate at periphery. Spiral whorls increasing rapidly. Body whorl very large, somewhat descended in front near aperture; bottom convex. Aperture rhombic. Lips simple and thickened at base, slightly expanded below. Peristome sharp, continuous. Callus distinct and thickened, making peristome a circle. Shell dull in yellowish brown. Bottom of body whorl paler; keel on periphery white.

Soft part: Body and tip of tentacles in juveniles leaden; stem of tentacles in lighter color. Anatomy unknown.

Etymology: This species is named after the name of type locality “Maonian County”.

Remarks: This species shows no community on shell surface shared by any known members of the genus. In *Pseudiberus* (s.l.) species, the growth lines are always straight and arranged in normal order. Ecologically, this species shows a very low population size.

3 Discussion

The malacofauna represented by helicoid (Bradybaenidae) snails in NW Sichuan showed a rather high diversity. In a variety of types of landscape, the species diversity differs from each other vastly. With respect to this survey, high level of diversity only oc-

curred in very limited areas and related to the condition of habitat in a strange way. For instance, in our thirty-days field work from Nanping to Dujiangyan, only in Mao County and Dujiangyan, the high diversity was observed. Dujiangyan, accordingly to its mild weather condition, gently wavy hills and good vegetation, belongs to the nature region of Chendu Campagna. Its malacofauna composition shows to be more similar to that of N Yunnan than easterly that of the E Sichuan. However, the situation of helicoid malacofauna is quite different in the drastically wavy mountain areas situated north to Dujiangyan. Vegetation status cannot represent positive correspondence in the helicoid species diversity status. For instance, Dagou (31°41'07"N, 103°53'58"E) in Mao County, none of the helicoid snails but slugs (Limacidae + Phylomycidae) occurred in good vegetation condition of substitution forest. The highest diversity of helicoid snails was observed in an innominate low hill (31°39'35.4"N, 103°48'48.7"E), ten kilometers apart from Dagou with area of ca. 500 × 300 m² and under arid condition. Over there five bradybaenid species lived together and they were in different abundance level from extremely high to rather low (i.e. only one empty shell of *Pseudobuliminus* (*Bulimindius*) sp. was seen).

The present study, served as accumulating the dataset relevant to the malacofaunal information and would not show any difference from those work made by former malacologists. However, it is expected that this work and previous ones will be synthesized to provide a departure point of a serious consideration to the malacodiversity, with in this region.

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